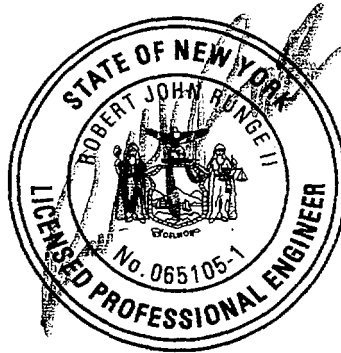


PROFESSIONAL ENGINEERS PLAN

For:

*Underground Process Wastewater Line
Inspection
&
North Plateau Contaminated Groundwater Line
Integrity*

Prepared For:
West Valley Demonstration Project
10282 Rock Springs Road,
West Valley, NY 14171



October 25, 2004
October 29, 2004, Rev. 1

Project #03027

RJR ENGINEERING, P.C.

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Underground Process Wastewater Line Inspection
and
North Plateau Force Contaminated Groundwater Line Integrity

Executive Summary:

A visual survey was performed on three (3) lines in the underground process wastewater drain system at the plant. Physical factors limited navigation of the video camera through the sewer lines, resulting in a total of 456 linear feet (lf) of line (including clean-out riser) recorded out of the 510 lf objective.

During the course of initial surveys, performed in 2003, a breach was identified in a lateral riser, below grade, designated as entry point "L," to line 15-ww-569. To complete the visual survey of the line, remedial work had to be performed to gain access and obtain video observations. Remedial work consisted of repairing a breached line, rebuilding cleanouts to gain access, and allow for future access and, cleaning sediment and debris from lines to obtain usable video.

With the exception of physical defects in the clean-out riser, the lines were found to be in overall sound condition. No joint gaps, offset joints roots, pipe erosion, corrosion, collapses, or deformation were found. The breach, that was discovered during inspection and subsequently repaired, was not due to the degradation of the pipe from conveyance usage but a break caused by construction of the original riser section or subsequent construction projects in the area. There also were sections with standing water or, sediment that could not be cleaned sufficiently to render a credible opinion on their condition. There were underground line sections targeted for video survey and ancillary lines not targeted for survey that were observed with substantive accumulations of standing water at elevations below the top invert of the pipes. This could be to improper pipe slope, sediment accumulation, or obstruction.

It is recommended that the lines be further cleaned of sediment and debris to allow for confirmation of the pipes integrity in one of the lines identified in this report as well as any other lines still in use.

It is recommended that lines be re-inspected on a routine basis as identified in the Recommendations section.

Active clean-out risers that tie into the main service lines should be video surveyed due to the integrity issues identified during the survey of clean-out risers for this report. In conjunction with a proper line cleaning program, it is recommended that cleanouts or access points be inventoried and evaluated to determine whether they are in service or not and, if not, do they need to be reinstated into service for line maintenance & inspection.

The recommendation above is based on the inability to render determinations for one section of line, the observation of standing water within other ancillary pipes in the system, the observations of substantive amount of sediment found in sections of some of the lines and, review of the site State Pollutant Discharge Elimination System permit conditions, which, require inspection and proper maintenance of the system. Questions on potential for surcharging of lines were raised by NYSDEC from review of previous integrity

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evaluation reports. Discussions with former West Valley employees indicated that grouting of clean-outs occurred after surcharging into the clean-out risers occurred. A program of routine cleaning of lines to remove solids accumulation is needed to alleviate the previously raised NYSDEC concern, as well as potential concerns with integrity observed in the accessed riser sections into these lines.

The North Plateau contaminated groundwater conveyance system is a relatively new system, installed in the latter half of the 1990s that is equipped with flow monitoring capabilities. Based on review of its construction history and several alternatives for integrity evaluation, it is recommended that hydraulic pressure testing of all underground sections of lines be performed on this system at a yearly frequency beginning within two years of this report.

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1.0 Purpose

The purpose of this report is two-fold:

1. Document results, findings and, recommendations from video inspection of roughly 456 linear feet (lf) of underground radioactive process wastewater conveyance lines at the West Valley Demonstration project (WVDP). The objective of the video inspection is to ascertain the integrity and useful life of the WVDP process waste water conveyance lines and provide recommendations for future routine inspection;
2. Identify appropriate method(s), guidelines, and schedule for inspection of the underground lines used for conveying contaminated groundwater associated with North Plateau Sr-90 groundwater plume within the WVDP premises.

2.0 Background

Radioactive process wastewater is collected from WVDP activities and transferred to the Low Level Waste Treatment Facility (LLWTF) Interceptor through a series of underground drain lines. The lines have been installed at various times throughout the history of the site and consist of various materials and technology. Drain lines 15-WW-570-4, 15-WW-843-6, and 15WW-569-6, hereafter referred to as lines "570," "843," and "569" respectively, are lines that convey wastewater flow for areas within and around the Main Process buildings to a series of concrete collection pits, identified as Interceptors. These lines, which are targeted for inspection and shown on Figure 1, were installed approximately 35 years ago. The lines are 4" and 6" diameter Duriron® pipe. Approximately ninety (90) lf of 6" diameter line is encased in concrete under the utility room while all other sections of the 6" and 4" diameter lines lie in a gravel bed. The configuration of the lines generally consist of a 4" diameter clean-out feeding a long sweep quarter bend, either a 4" to 6" diameter or 4" to 4" diameter "Y" branch, and several lengths of straight pipe. The pipe was installed using traditional plumbing methods and techniques of the time. The bell and spigot pipe joints were made with acid resistant Sealite rope packing sealed with molten lead.

Duriron® pipe is a brittle corrosion resistant alloy. The inside surface texture can be compared to ductile iron or cast iron. Manufacturers published information states that, "Duriron® pipe is expected to last the life of the building installation". Data or inspection and testing studies, regarding the condition of Duriron® pipe in use, have not been published by the manufacturer or any other known sources.

North Plateau contaminated groundwater is being pumped to the LLWTF. The underground lines for this conveyance system were installed in the latter half of the 1990s. Because these lines are relatively new and constructed of a continuous run at High Density Poly Ethylene (HDPE) no integrity testing has been done on these lines since initial start-up.

3.0 Scope Work

Scope of work to support preparation of this report included.

1. Complete and assess video survey of roughly 510 lf along three (3) drain lines, "570", "843" and, "569" servicing the main plant;
2. Review manufacturer's and other technical literature on the construction materials/techniques utilized at the WVDP for underground process wastewater and contaminated groundwater conveyance lines;
3. Development of engineering opinions on the integrity and anticipated useful life of the piping and recommendations for future maintenance inspection based on review of the video surveys;
4. Document repair of a breached wastewater clean-out riser line at entry point "L"; and,
5. Recommend an appropriate method to evaluate the integrity of the underground lines used to convey Sr-90 contaminated groundwater from the North Plateau area within the WVDP premises.

4.0 Results and Observations

Segments of each of the three (3) surveyed lines contained sediment. The sediment encountered was enough to hinder the survey in these segments, even after flushing of the lines prior to performing the survey. A pipeline pressure washer was obtained and the pipes were flushed with varying results. These results depended on the available access and the amount and type of sediment.

The footage counter, which appears on the video, is located on the cable reel. Locations are given so the reader can identify specific location on the video.

A copy of the video surveys for each of the three (3) recorded lines is provided as Appendix C. The following are the engineers comments on the survey and are not intended to be a substitute for watching the videos.

Line 15-WW-570, via entry points "A" and "C", 130 feet of recording:

It was discovered that proposed entry point "A" had been grouted closed and entry point "C" would not allow access to line "570" in the east west direction. Another entry was attempted at a point north of Entry point "A" but the camera could not navigate past the multiple fittings and bends in the line. At this point it was decided that the entry point "C" would be developed to allow for access to line "570." A vault with clean-out risers was installed.

It is noted that, from video insertion starting at entry point "C" and working up stream, the camera was advanced all the way to point "A" and video recording was performed as the

camera was withdrawn to point "C." This was done because the sediment accumulation in the lines obscured the view. Observations are as follows:

Observations from first entry on 9/22/04:

1. At 130.9' the grout in access point "A" is visible beyond the "T" section going to the north.
2. At 106' sediment build-up starts again.
3. At 99.3' a bolt is in the pipe.
4. At 67.9' staining at top of pipe.
5. At 64.3' there is a pipe junction with sediment build up.
6. At 53.8' there is a circumferential build-up appearing in the horizontal section of pipe.
7. At 47.3' camera is being pulled through and beneath the sediments.
8. At 41.5' no usable video from this point downstream due to standing water.

Observations from second entry on 9/23/04 (after power flushing the pipe):

The camera was reinserted into the pipe to collect additional recordings. The camera was re-advanced to 69.0 feet. Upon withdrawal the pipe is well cleaned

1. At 66.3' the build-up at the pipe junction is removed.
2. At 55.8' there is a circumferential ring in the horizontal section of pipe which is showing a irregular shaped circle.
3. At 48.1' standing water reappears.
4. At 46.1' water depth increase.
5. At 44.0' the camera becomes submerged.
6. At 33.1' the camera emerges from the water. There is also a pipe junction to the right.

During construction to install the vault and gain access to the pipe system, it was noted that the line south of entry point "C" would drain slowly and have a certain amount of standing water in it at all times.

Line 15-WW-843, via entry Point "D," 90 feet of recording:

Notable video results from camera insertion at Point "D" are as follows;

1. At 5.2' packing is hanging from the joint in the top of the horizontal line section.
2. At 61' hit sediments.
3. At 72.6' debris in pipe no video available. Advanced camera to 91.4' through sediment and flushing.
4. At 91.5' stopped advancing at "T" section.
5. At 91.5' usable video was obtained upon withdrawal after flushing.

Line 15-WW-569, via entry point "E" & "L," 234 feet of recording:

The camera was inserted and distance counted from the top of the entry point. Notable points on the video recorded line are as follows:

Recording from point "E" to point "L":

1. At 6.4' there appears to be longitudinal cracking in the clean-out riser pipe.
2. At 16' scale and sediment build up appear.
3. At 19.5' water and sediments are built up on the bottom.
4. At 25.8' water flows in from the left.
5. At 29.4' "T" section from above.
6. At 47' entry from the left, with sediment buildup at the junction. Could be from flushing operations.
7. At 109' looks like a pen in the sediments.
8. From 109' on, poor visibility due to sediments.
9. Video ends at 124.8' of which 12.5' is clean-out section. This passes entry point "L" at 119' (note red cloth in pipe invert).

Entry point "L":

The first attempts into entry point "L" on 10/14/03 failed due to a blockage in the clean-out riser. From the video recordings, it was not clear whether the pipe was clogged or there was a breach of the pipe. Operations were then undertaken to expose the pipe and fix the clog and, or breach. After exposing the section of pipe, it was confirmed that the section of pipe in the clean-out riser had a puncture hole at an elbow. The recordings, at entry "L", were made after the clean-out riser section was exposed and the broken section of pipe removed and, before replacing the clean-out riser section.

Video recordings from point "L" were taken on four (4) separate occasions. The first recording is when the breach and obstruction were encountered. There are three (3) recordings after the obstruction and breach were overcome. The first recording 9/27/04 was prior to power washing. The second recording was after power washing was performed through accessing point "L". The third recording was after power washing from the old Interceptor. (The recordings show enough debris and sediment in the piping to prevent achieving the quality of recording obtained in the other lines).

5.0 Findings

The following findings are based on the inspection objective to identify cracks, joint gaps, offset joints, roots, erosion, corrosion, collapse, leaks, perforations and/or any other evidence of infiltration into, or exfiltration from the surveyed lines.

Line "570": There is no evidence from the recordings that indicate the pipe integrity has been compromised. The standing water in the pipe may be attributable to a flat section in the pipe slope or, sediment buildup downstream.

Line "843": The packing that is protruding from a joint in the horizontal section is at the top of the pipe and is not of consequence as long as the line "843" and downstream lines (i.e. "569") are properly maintained to prevent surcharging (e.g.,

program of routine solids removal to prevent blockage). If the line is allowed to surcharge, the joint with the protruding packing could allow a discharge to the environment. At 91.5 feet into the pipe at the "T" intersection, there are two tabs in the line which I have not been able to identify. These tabs are probably not compromising the integrity of the pipe at this time. However, I believe this warrants future investigation to better address consequences from a surcharged condition. Although there are observed accumulated sediments, the pipe is in good condition and there are no concerns with its integrity at this time.

Line "569":

Entry point "E" - In the clean-out riser section, there appears to be longitudinal cracking with minor seepage infiltrating through the crack. This cracking could be due to frost action or construction in the area over the years. It does not appear to be of issue as long as line "569" and downstream connections are properly maintained to prevent surcharging. There is enough sediment and standing water in the pipe to obstruct the view of the invert. From the water line to the top of the pipe appears to be in good condition. However, the actual amount of pipe viewable is limited in some areas. The areas that are visible provide no indications of any integrity issues.

Entry Point "L" - Upon trying to access through point "L", a blockage was encountered in the clean-out riser section. After excavation a puncture hole in an elbow section of the pipe between two fittings in the clean-out riser was found. As indicated by Photos No. 1 & 2 provided in Appendix B, this break appears to be not related to the pipe function or serviceability but rather damage caused during original installation of the pipe or subsequent nearby construction operations, Photo No. 3 shows the extent of the clog in clean-out riser "L", as well as, an indication of the pipes cross-section.. The broken section of pipe was removed and access gained for the camera. The piece was replaced with a new clean-out riser section as shown in Photo No. 4, provided in Appendix "B".

Line pressure washing and flushing operations were performed from entry point "L" downstream and from the interceptor upstream. The results of the pressure cleaning were not satisfactory to provide enough visual observations to render a credible opinion on the pipe integrity beyond 60 feet ± downstream of point "L".

6.0 Conclusions and Recommendations

Process Waste Water Conveyance System

Conclusions:

The two locations of concern, line 15-ww-569 & clean-out riser "L", are identified.

- a. Line 15-ww-569 has joint packing hanging from the top of the joint and is not of concern as long as there is no surcharging of the line.
- b. Clean-out riser at "L" has been repaired.

Recommendations:

1. Check all exterior access points to inventory those which are sealed and those which remain unsealed.

Access points originally thought to be available were inaccessible. Upon investigation these points were either grouted closed or could not be found. These access points were a part of the original system design and future needs may not have been fully considered when these points were made inaccessible.

Assuming a proper line cleaning program is implemented (see Recommendation 3), it is recommended that clean-out risers be inventoried and evaluated to determine whether they are in service or not. If not, do they need to be reinstated into service for line inspection purposes

2. Video inspect all accessible exterior clean-out risers that are determined to be in use.

Structurally, a breach in clean-out riser section "L" was discovered and apparent longitudinal cracking in the clean-out riser at "E" was also identified. The breach at "L" appears to be construction-related and not operation or service-related. The longitudinal cracking at "E" may be due to either frost action or work activities in the area and does not seem to be compromising the system integrity as long as the system is properly maintained and does not surcharge. Since the breach at "L" was receiving the laundry waste stream and was not evident until video surveys were performed, it is recommended that other lines (e.g. clean-out risers and laterals) that convey process wastewater flow, that have not already been surveyed, should be surveyed.

3. Implement a routine cleaning program for the accessible main service lines, and clean-out risers.

There is no documentation as to the grouting of the clean-out risers. After conversations with previous West Valley employees, one can conclude that it was to prevent surcharging up into the clean-out riser. A program of routine cleaning of all accessible lines and clean-outs to remove solids accumulation is recommended as it is important to prevent releases and system bypasses from occurring. This cleaning program may also alleviate NYSDEC concerns on surcharging, as well as potential concerns with integrity observed in the accessed clean-out riser sections into these lines. Also, it should be noted that implementation of this program will also fulfill, in part, the site State Pollutant Discharge Elimination System permit conditions, which require inspection and proper maintenance of the system.

Although sediment build up in the system is expected, the build up in line "569" is beyond reasonable expectation and needs to be cleaned. Although, sediment accumulation in line "570" was cleaned, there was still standing water in the pipe and it was evident that line "571" passing under the FRS was not flowing properly. This was evident in the back up of water and its eventual draining down. Therefore, it is recommended that line "571" and the remaining portion of "570" be cleaned and video surveyed.

4. Reinspect lines "570", "843," and "569"

It is recommended that these lines be video surveyed on a 5-year cycle.

5. Line Identification: The entire underground process wastewater line system should be identified for which lines and clean-out risers are still in use. Those not in use can then be identified as out-of-service.

Recommendation for North Plateau Contaminated Groundwater Underground Transfer Lines:

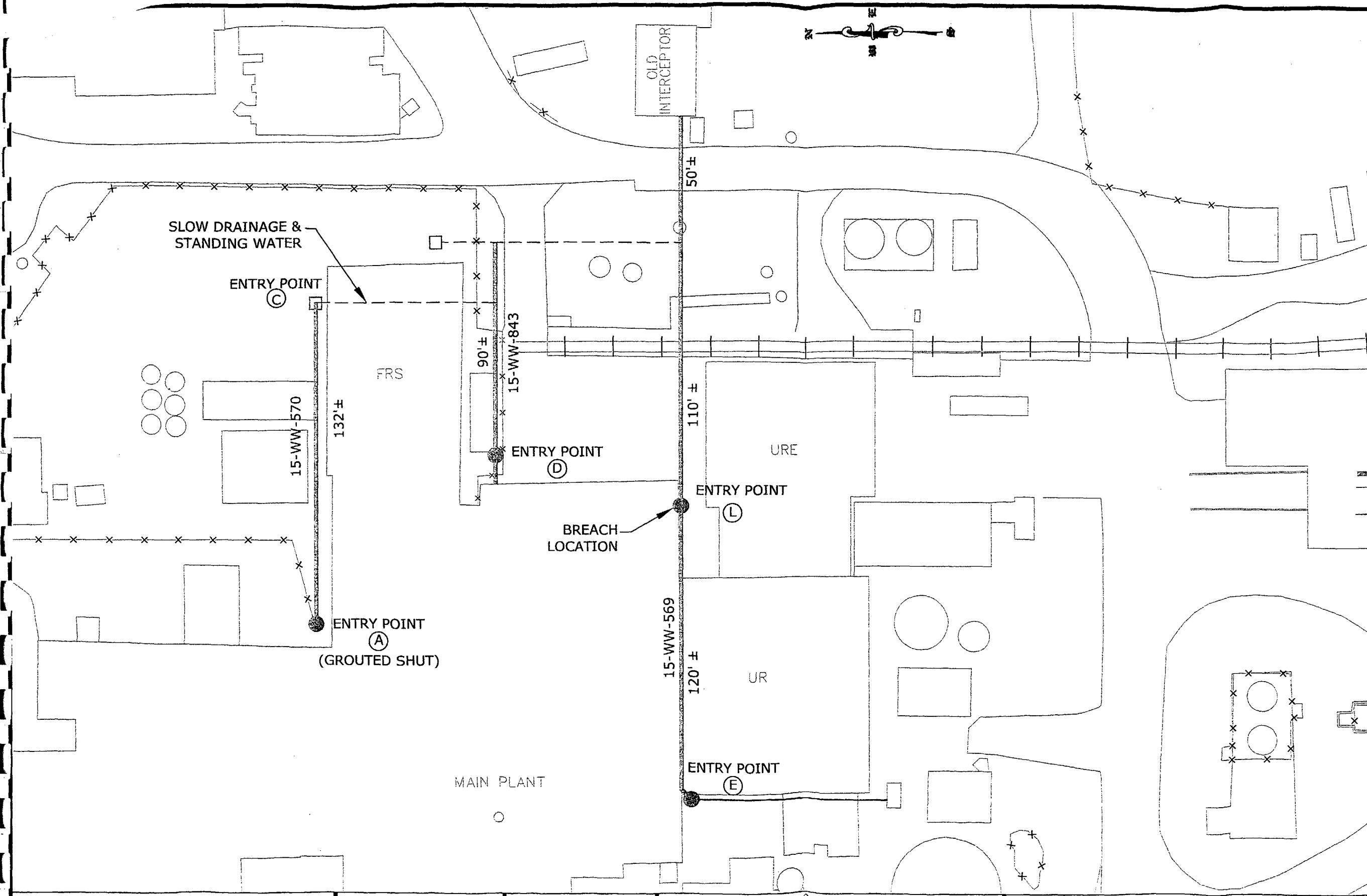
The North Plateau contaminated groundwater underground transfer lines are relatively new, as this conveyance system was installed in the latter half of the 1990s. This system is equipped with flow monitoring capabilities that may be amenable to assess integrity but not to the tolerance need for small leaks in underground piping constructed of HDPE.

An appropriate method for testing the underground lines for this system has been identified and is recommended as follows:

- 1) A pressure gauge should be fitted at both ends of the line with the ability to isolate the line in question and pressurize the line using a liquid to a pressure of 1.5 times the calculated or known operating pressure of the line.
- 2) Since the piping system being tested may be of different materials, the pressure hold time and allowable make-up water used to repressurize should be calculated based on AWWA Standards.
- 3) The initial test should be performed within the next two years and perpetual testing on an annual basis or, at any time there is suspicion of a leak.

APPENDIX A: WVNSCO "PLAN VIEW DWG"

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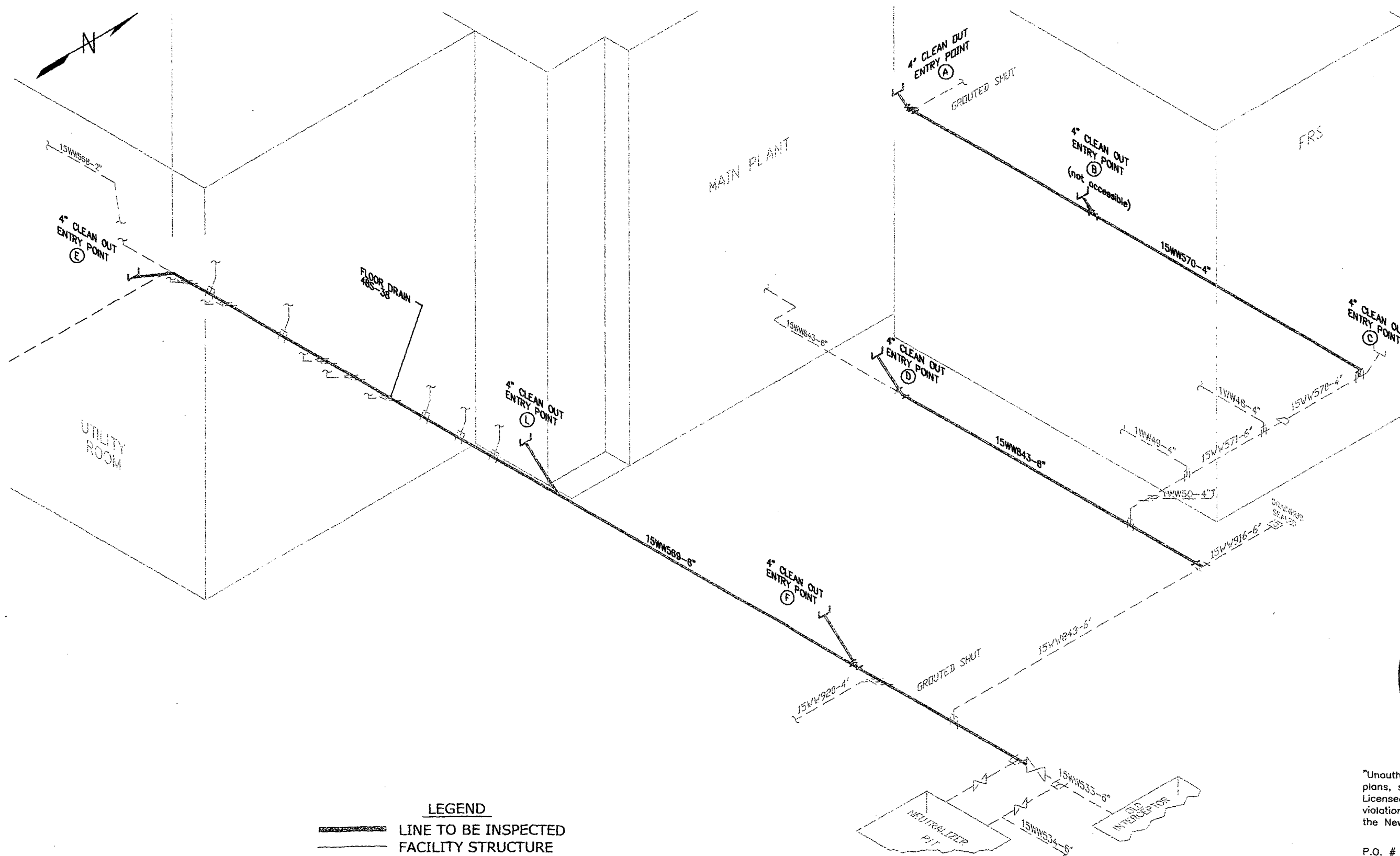
- LEGEND**
- LINE TO BE INSPECTED
 - FACILITY STRUCTURE
 - ENTRY POINT
 - - - EXISTING LINE NOT TO BE INSPECTED
 - ENTRY POINT



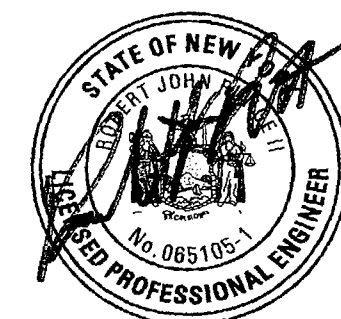
"Unauthorized alteration or addition to any plans, specifications or reports bearing a Licensed Professional Engineer's seal is a violation of Section 7209, subdivision 2, of the New York State Education Law".

P.O. # 19-102592-C-DO
RJR-03027
AR# 002 REV 1
DATE: 10-29-04

<p>RJR ENGINEERING, P.C. PROFESSIONAL ENGINEERS P.O. BOX 344 - 23 Mechanic Street Springville, New York 14141-0344 PH. (716)-592-3980 FAX. (716)-592-4216 www.rjpc.com</p>	<p>DRAWN BY: DRS DATE: OCTOBER, 2004 CAD FILE: SERVER Z:\PROJECTS\WVNS\03027-Underground Rod Line\Engineering Report\FLYOVER2-REVB.dwg</p>	<p>APPROVED BY: RJR PROJ. NO.: 03027 SCALE: 1"=40'</p>	<p>CLIENT: WVNSCO WEST VALLEY DEMONSTRATION PROJECT 10282 ROCK SPRINGS ROAD WEST VALLEY, NEW YORK 14171-9799</p>	<p>PROJECT: WVNSCO UNDERGROUND PROCESS DRAIN LINE INSPECTION 10282 ROCK SPRINGS ROAD WEST VALLEY, NEW YORK 14171-9799</p>	<p>SHT. NAME PLAN VIEW FIGURE 1</p>	<p>SHT. NO. SK-1</p>
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LEGEND
 — LINE TO BE INSPECTED
 — FACILITY STRUCTURE
 - - - EXISTING LINE NOT TO BE INSPECTED



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DRAWN BY: DRS
 DATE: OCTOBER, 2004
 CAD FILE: SERVER Z:\PROJECTS\WVNS\03027-Underground Rad Line\Engineering Report\ISO2-REV8.dwg

APPROVED BY: RJR
 PROJ. NO.: 03027
 SCALE: NOT TO SCALE

CLIENT: **WVNSCO**
WEST VALLEY DEMONSTRATION PROJECT
 10282 ROCK SPRINGS ROAD
 WEST VALLEY, NEW YORK 14171-9799

PROJECT: **WVNSCO**
UNDERGROUND PROCESS DRAIN LINE INSPECTION
 10282 ROCK SPRINGS ROAD
 WEST VALLEY, NEW YORK 14171-9799

SHT. NAME
ISOMETRIC VIEW
FIGURE 2

SHT. NO.
SK-2

APPENDIX B: Pre- and Post-Repair Photos of Breach at Point "L"

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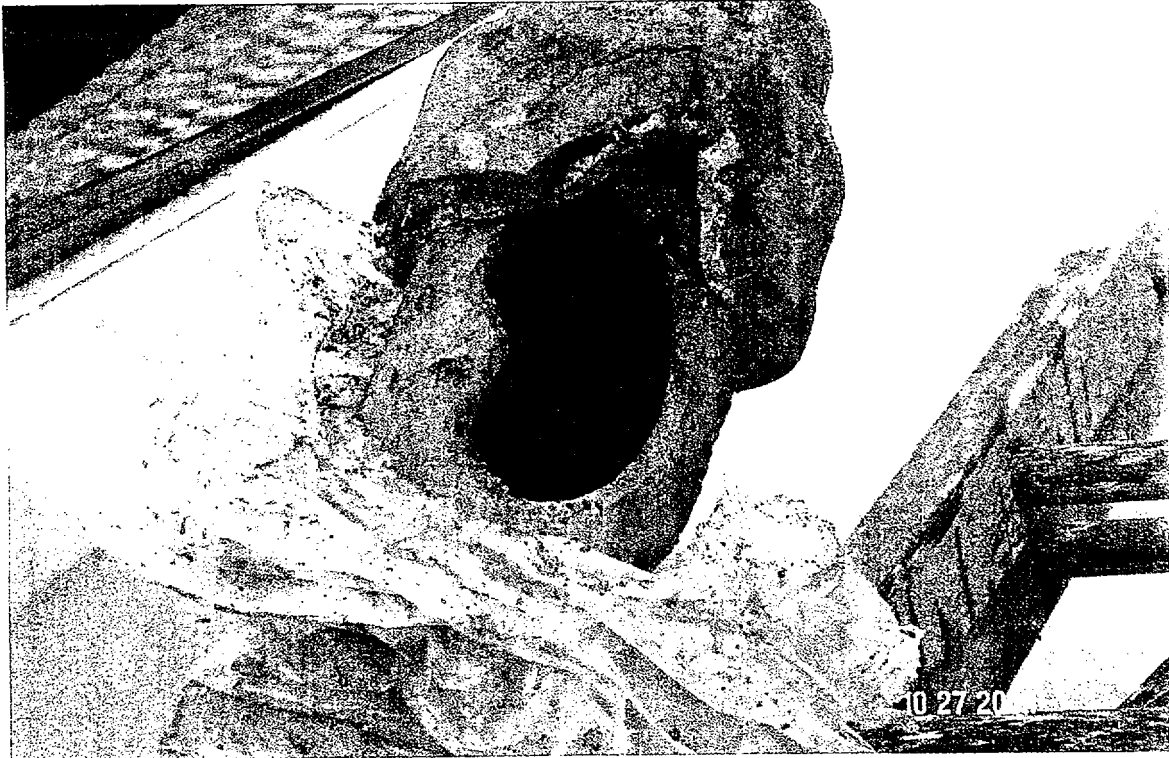


Photo # 1 Breach "L"



Photo #2 Just Above Breach at "L"

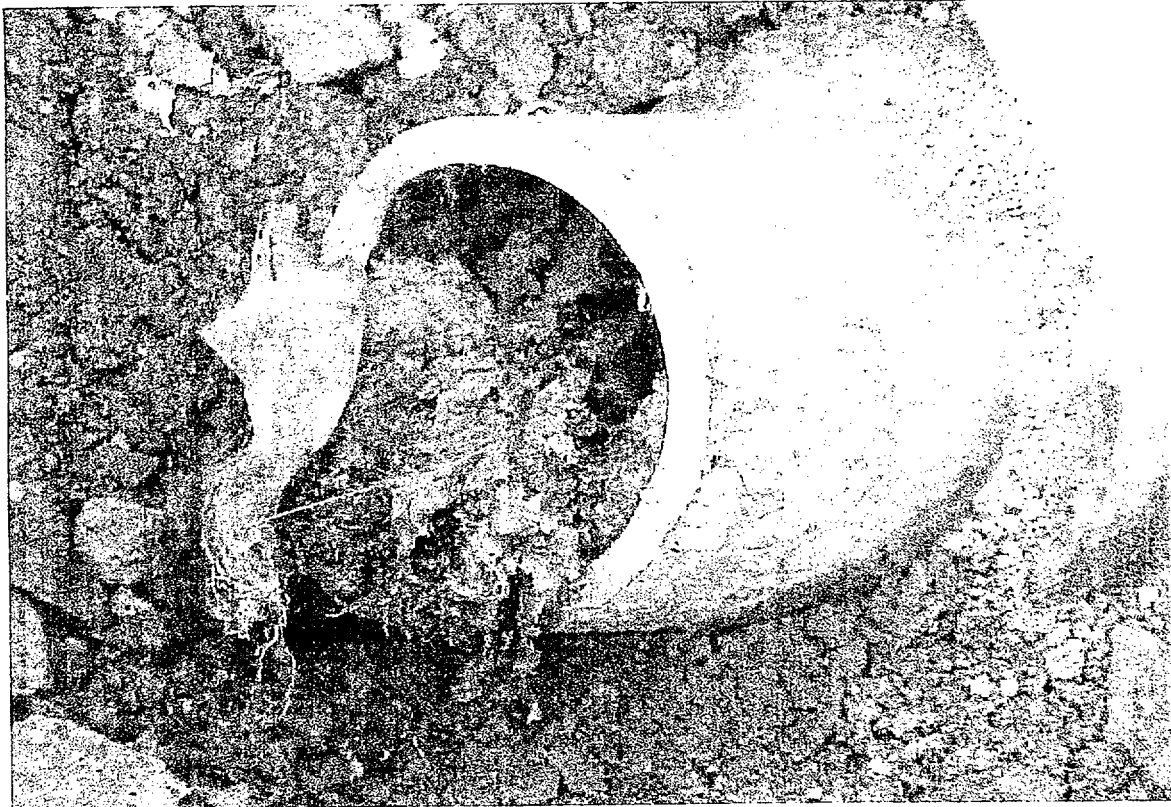


Photo #3 Clog at "L"

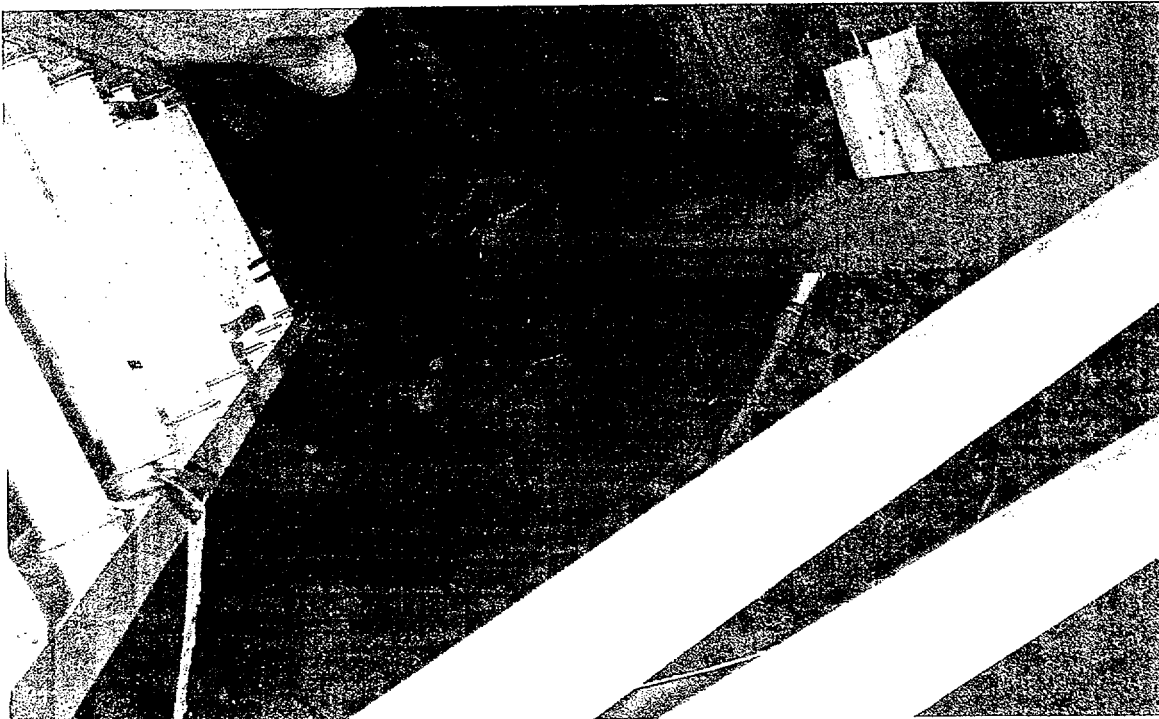


Photo #4 Repair at "L"

APPENDIX C: VHS Tape Recordings of Video Surveys

1. Point A to C (15-WW-570-4) & Point C to B (15-WW-570-4),
2. Point "D" with pressure washer (6-15-04),
3. Point "E" 1 / 2 & Point "E" 2 / 2 (9-30-04),
4. Point "L" (9-27-04, 9-28-04 & 9-30-04),
5. Point "L" (10-14-03).

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